

Conc'd  
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B3  
OMW  
OS

path through the switch, and a control signal path, and wherein the control signals are isolated from the RF signal path.

9. (Amended) The circuit of Claim 30, wherein said single MEM switch provides said reference signal path.

Add  
sp2  
P2

14. (Amended) The circuit of Claim 30, wherein said MEM switches are metal-metal contact RF MEMS series switches.

Sub  
B3

21. (Amended) The circuit of Claim 27, wherein said first and second MEM switch circuits provide MPMT switching functions.

Add the following new claims.

25. (New) An electronically scanned array, comprising:

a linear array of radiating elements;

an array of phase shifters coupled to the radiating elements;

an RF manifold including a plurality of phase shifter ports respectively coupled to a corresponding phase shifter RF port and an RF port; and

10 a beam steering controller for providing phase shift control signals to the phase shifters to control the phase shift setting of the array of the phase shifters;

15 and wherein said phase shifters each include a plurality of micro-electro-mechanical ("MEM") switches responsive to said control signals to select one of a discrete number of phase shift settings for the respective phase shifter,

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said phase shifters including switched line phase shifters including a reference signal path and at least one phase shift signal path, each path having an electrical length selected to provide a phase shift value at an operating wavelength, and wherein the plurality of MEM switches are configured to select either said reference path or one of said at least one phase shift path and wherein a single MEM switch selects said reference signal path.

*Same 15  
1+2 X → 26. (New) The array of Claim 25 wherein said single  
MEM switch provides said reference signal path.*

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*Claim 26*  
*26. (New) An electronically scanned array, comprising:*

a linear array of radiating elements;  
an array of reflection phase shifters coupled to the radiating elements;

an RF manifold including a plurality of phase shifter ports respectively coupled to a corresponding phase shifter RF port and an RF port; and

a beam steering controller for providing phase shift control signals to the phase shifters to control the phase shift setting of the array of the phase shifters;

and wherein said phase shifters each include:

15 a plurality of micro-electro-mechanical ("MEM") switches responsive to said control signals to select one of a discrete number of phase shift settings for the respective phase shifter;

20 a coupler device having first and second RF I/O ports, and in-phase and quadrature ports, and first and second reactance circuits respectively coupled to the in-phase and quadrature ports by first and second

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MEM switch circuits, said first and second reactance circuits each comprising a plurality of susceptances <sup>(New)</sup> connected in parallel for terminating said in-phase or quadrature port, and wherein first and second MEM switch circuits select at least one of said plurality of susceptances connected in parallel for each of said first and second reactance circuits to select a phase shift setting, and wherein said plurality of susceptances can be selected individually and in parallel combinations. <sup>(New)</sup> 3?

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*AS  
CM*

28. (New) The array of Claim 27, wherein said first and second MEM switch circuits each comprise first, second and third MEM switches each terminated respectively in a first, second or third one of said plurality of susceptances.

29. (New) The array of Claim 28, wherein said plurality of susceptances can be switched individually and in parallel combinations to provide at least eight different discrete phase settings.

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30. (New) An RF phase shifter circuit, comprising:  
first and second RF ports;  
a switch circuit comprising a plurality of single-pole-single-throw (SPST) micro-electro-mechanical ("MEM") switches responsive to control signals, said switch circuit arranged to select one of a plurality of discrete phase shift values introduced by the phase shifter circuit to RF signals passed between the first and second RF ports, said circuits connected to provide a single-pole-multiple-throw

10 (SPMT) or multiple-pole-multiple-throw (MPMT) switch function; and

15 wherein said phase shift circuit is a switched line phase shift circuit, and further includes a reference phase signal path and at least one phase shift path, said switch circuit arranged to select one of said reference or said at least one signal paths in response to phase shift control signals, and wherein a single MEM switch selects said reference signal path

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31. (New) An RF reflection phase shifter circuit, comprising:

a coupler device having first and second RF I/O ports, and in-phase and quadrature ports;

10 a switch circuit comprising a plurality of single-pole-single-throw (SPST) micro-electro-mechanical ("MEM") switches responsive to control signals, said switch circuit arranged to select one of a plurality of discrete phase shift values introduced by the phase shifter circuit to RF signals passed between the first and second RF ports, said circuits connected to provide a single-pole-multiple-throw (SPMT) or multiple-pole-multiple-throw (MPMT) switch function;

15 said MEM switch circuit including first and second reactance switch circuits selectively coupling first and second termination reactance circuits respectively to the in-phase and quadrature ports, each said reactance circuit including a plurality of selectable reactance values connected in parallel which are selectable individually or 20 in parallel combinations to select different phase shift values.

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32. (New) A multi-section RF phase shifter circuit, comprising:

a plurality of phase shift sections connected in series to provide a discrete set of selectable phase shifts to RF signals passed through the circuit, and wherein each phase shift section includes:

first and second RF ports;

a switch circuit comprising a plurality of single-pole-single-throw (SPST) micro-electro-mechanical ("MEM") switches responsive to control signals, said switch circuit arranged to select one of a plurality of discrete phase shift values introduced by the phase shifter circuit to RF signals passed between the first and second RF ports, said circuits connected to provide a single-pole-multiple-throw (SPMT) or multiple-pole-multiple-throw (MPMT) switch function; and

wherein said phase shift circuit is a switched line phase shift circuit, and further includes a reference phase signal path and at least one phase shift path, said switch circuit arranged to select one of said reference or said at least one signal paths in response to phase shift control signals, and wherein a single MEM switch selects said reference signal path.

33. (New) A multi-section RF phase shifter circuit, comprising:

a plurality of reflection phase shift sections connected in series to provide a discrete set of selectable phase shifts to RF signals passed through the circuit, and wherein each reflection phase shift section includes: